Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	83	cantilever same (finger or tip) same (antibody or hybrid$4 or antigen or ligand or bind$3)	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 13:02
L2	7	l1 and ((no or without) same (oscilat$3 or vibrat$3)) and (optical or light or deflect$3 or diffract$3)	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:52
L3	991	cantilever same (without or no) same (socilat$3 or vibrat$3 or AFM or (atomic near2 forced))	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:54
L4	991	cantilever same (without or "no") same (socilat$3 or vibrat$3 or AFM or (atomic near2 forced))	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:55
L5	360	cantilever same (without or "not adj1 required") same (socilat$3 or vibrat$3 or AFM or (atomic near2 forced))	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:55
L6	179	l5 and power	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:55
L7	152	l6 and @py<"2004"	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:55
L8	123	l6 and @py<"2003"	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:55
L9	20	l8 and (antibody or antigen or ligand or binding or hybrid$4)	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:56
L10	108	cantilever same (finger or tip or immobili$4) same (antibody or hybrid$4 or antigen or ligand or bind$3)	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 13:02
L11	87	l10 and @py<"2004"	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 13:03

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3134	cantilever same light	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/01/04 12:39
L2	113	cantilever same light same diffraction	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/01/04 12:39
L3	328	cantilever same light same (deflect or diffraction or grating)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/01/04 12:40
L4	29	l3 and (antibody or hybridization or binding)	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/01/04 12:41
L5	5	l3 and ((antibody or hybridization or binding) same (tip or finger))	US-PGPUB; USPAT; EPO; DERWENT	OR	ON	2005/01/04 12:41

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	83	cantilever same (finger or tip) same (antibody or hybrid$4 or antigen or ligand or bind$3)	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:46
L2	7	l1 and ((no or without) same (oscilat$3 or vibrat$3)) and (optical or light or deflect$3 or diffract$3)	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:52
L3	991	cantilever same (without or no) same (socilat$3 or vibrat$3 or AFM or (atomic near2 forced))	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:54
L4	991	cantilever same (without or "no") same (socilat$3 or vibrat$3 or AFM or (atomic near2 forced))	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:55
L5	360	cantilever same (without or "not adj1 required") same (socilat$3 or vibrat$3 or AFM or (atomic near2 forced))	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:55
L6	179	l5 and power	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:55
L7	152	l6 and @py<"2004"	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:55
L8	123	l6 and @py<"2003"	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:55
L9	20	l8 and (antibody or antigen or ligand or binding or hybrid$4)	US-PGPUB; USPAT; EPO; DERWENT	OR	OFF	2005/01/04 12:56

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accessing the remaining file names entered.
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                                                         ENTRY    SESSION
FULL ESTIMATED COST                                       0.21       0.21

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=>  cantilever and finger and (antibody or antigen or ligand or DNA or protein)
L1             0 FILE AGRICOLA
L2             0 FILE BIOTECHNO
L3             0 FILE CONFSCI
L4             0 FILE HEALSAFE
L5             0 FILE IMSDRUGCONF
L6             0 FILE LIFESCI
L7             0 FILE MEDICONF
L8             1 FILE PASCAL

TOTAL FOR ALL FILES
L9             1 CANTILEVER AND FINGER AND (ANTIBODY OR ANTIGEN OR LIGAND OR DNA
                 OR PROTEIN)

=> d l9 ibib abs total

L9    ANSWER 1 OF 1  PASCAL  COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on
      STN
ACCESSION NUMBER:          2003-0352395   PASCAL
COPYRIGHT NOTICE:          Copyright .COPYRGT. 2003 American Institute of
                           Physics. All rights reserved.
TITLE (IN ENGLISH):        Microfabricated mechanical biosensor with inherently
                           differential readout
AUTHOR:                    SAVRAN C. A.; BURG T. P.; FRITZ J.; MANALIS S. R.
CORPORATE SOURCE:          Media Laboratory, Massachusetts Institute of
                           Technology, 20 Ames Street, Cambridge, Massachusetts
                           02139
SOURCE:                    Applied physics letters, (2003-08-25), 83(8),
```

1659-1661
ISSN: 0003-6951 CODEN: APPLAB
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-10020
AN 2003-0352395 PASCAL

AB We report measurements with a micromachined mechanical biosensor that inherently suppresses background effects by producing a differential signal with respect to a reference. The sensor comprises two adjacent **cantilevers** with interdigitated **fingers** between them that allow interferometric detection of the differential, i.e., relative bending. We demonstrate that differential detection can efficiently suppress unspecific chemical effects that result in **cantilever** bending. We show that the differential deflection noise is up to an order of magnitude lower than the absolute deflection noise in the low-frequency range of 0.0003-1 Hz, where many types of biologically relevant reactions occur. We also demonstrate the sensor<right single quotation mark>s applicability to biological receptor-**ligand** systems by reporting experimental results on direct differential detection of biotin-streptavidin binding. .COPYRGT. 2003 American Institute of Physics.

=> cantilever and (immobilized or immobilizing) and (antibody or antigen or ligand or DNA or protein)
L10 0 FILE AGRICOLA
L11 8 FILE BIOTECHNO
L12 0 FILE CONFSCI
L13 0 FILE HEALSAFE
L14 0 FILE IMSDRUGCONF
L15 0 FILE LIFESCI
L16 0 FILE MEDICONF
L17 13 FILE PASCAL

TOTAL FOR ALL FILES
L18 21 CANTILEVER AND (IMMOBILIZED OR IMMOBILIZING) AND (ANTIBODY OR ANTIGEN OR LIGAND OR DNA OR PROTEIN)

=> l18 and (light or optical or diffract)
L19 0 FILE AGRICOLA
L20 0 FILE BIOTECHNO
L21 0 FILE CONFSCI
L22 0 FILE HEALSAFE
L23 0 FILE IMSDRUGCONF
L24 0 FILE LIFESCI
L25 0 FILE MEDICONF
L26 0 FILE PASCAL

TOTAL FOR ALL FILES
L27 0 L18 AND (LIGHT OR OPTICAL OR DIFFRACT)

=> cantilever and (antibody or antigen or ligand or DNA or protein) and (light or optical or diffract)
L28 0 FILE AGRICOLA
L29 2 FILE BIOTECHNO
L30 0 FILE CONFSCI
L31 0 FILE HEALSAFE
L32 0 FILE IMSDRUGCONF
L33 2 FILE LIFESCI
L34 0 FILE MEDICONF

L35 10 FILE PASCAL

TOTAL FOR ALL FILES
L36 14 CANTILEVER AND (ANTIBODY OR ANTIGEN OR LIGAND OR DNA OR PROTEIN) AND (LIGHT OR OPTICAL OR DIFFRACT)

=> dup rem
ENTER L# LIST OR (END):l36
DUPLICATE IS NOT AVAILABLE IN 'IMSDRUGCONF, MEDICONF'.
ANSWERS FROM THESE FILES WILL BE CONSIDERED UNIQUE
PROCESSING COMPLETED FOR L36
L37 11 DUP REM L36 (3 DUPLICATES REMOVED)

=> d l37 ibib abs total

L37 ANSWER 1 OF 11 PASCAL COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on STN
ACCESSION NUMBER: 2004-0244531 PASCAL
TITLE (IN ENGLISH): A poly (vinyl alcohol)/carbon-black composite film: A platform for biological macromolecule incorporation
AUTHOR: BROTT L. L.; ROZENZHAK S. M.; NAIK R. R.; DAVIDSON S. R.; PERRIN R. E.; STONE M. O.
CORPORATE SOURCE: Mat. and Manufacturing Directorate Air Force Research Laboratory, Wright-Patterson AFB, OH 45433-7702, United States
SOURCE: Advanced Materials, (2004), 16(7), 592-596+574, 23 refs.
ISSN: 0935-9648 CODEN: ADVMEW
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Germany, Federal Republic of
LANGUAGE: English
AVAILABILITY: INIST-22427
AN 2004-0244531 PASCAL
AB A biomimetic infrared sensor has been fabricated that takes advantage of the unique thermosensing properties of the Tip A **protein** of Salmonella. By integrating this **protein** into a matrix of poly(vinyl alcohol) doped with conductive carbon black and plasticizer a simple and reliable thermally sensitive array can he fabricated (see Figure). This array can track the heat from a flashlight over 6 m away or distinguish between three independent heat source.

L37 ANSWER 2 OF 11 PASCAL COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on STN
ACCESSION NUMBER: 2003-0050628 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2003 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Fabrication and characterization of a micromechanical sensor for differential detection of nanoscale motions
AUTHOR: SAVRAN Cagri A.; SPARKS Andrew W.; SIHLER Joachim; JIAN LI; WU Wan-Chen; BERLIN Dean E.; BURG Thomas P.; FRITZ Juergen; SCHMIDT Martin A.; MANALIS Scott R.
CORPORATE SOURCE: Media Laboratory and the Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139, United States; Media Laboratory and the Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139, United States; Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139, United States; Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139, United States; Media Laboratory and the Department of Electrical Engineering and Computer

Science, Massachusetts Institute of Technology, Cambridge, MA 02139, United States; Media Laboratory, Massachusetts Institute of Technology, Cambridge, MA 02139, United States; Department of Electrical Engineering and Computer Science and the Microsystems Technology Laboratories, Massachusetts Institute of Technology, Cambridge, MA 02139, United States; Media Laboratory and the Division of Biological Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139, United States

SOURCE: Journal of microelectromechanical systems, (2002), 11(6), 703-708, 15 refs.
ISSN: 1057-7157

DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-22521, 354000105661990100

AN 2003-0050628 PASCAL

AB We have micromachined a mechanical sensor that uses interferometry to detect the differential and absolute deflections of two adjacent **cantilevers**. The overall geometry of the device allows simple fluidic delivery to each **cantilever** to immobilize molecules for biological and chemical detection. We show that differential sensing is 50 times less affected by ambient temperature changes than the absolute, thus enabling a more reliable differentiation between specific **cantilever** bending and background effects. We describe the fabrication process and show results related to the dynamic characterization of the device as a differential sensor. The root-mean-squared (rms) sensor noise in water and air is .eqvsim.1 nm over the frequency range of 0.4-40 Hz. We also find that in air, the deflection resolution is limited only by the **cantilever**'s thermomechanical noise level of 0.008 A/Hz.sup.1.sup./.sup.2 over the frequency range of 40-1000 Hz.

L37 ANSWER 3 OF 11 PASCAL
on STN

ACCESSION NUMBER: 2004-0010577 PASCAL

TITLE (IN ENGLISH): Translating molecular interaction into a nanomechanical signal
New challenges in mesomechanics : Aalborg, 26-30 August 2002
AUTHOR: THAYSEN Jacob; BOISEN Anja
PYRZ R. (ed.); SCHJODT-THOMSEN J. (ed.); RAUHE J.C. (ed.); THOMSEN T. (ed.); JENSEN L.R. (ed.)
CORPORATE SOURCE: Cantion A/S, Orsteds Plads, Bldg. 347, 2800 Lyngby, Denmark; Mikroelektronik Centret, Orsteds Plads, Bldg. 345 east, 2800 Lyngby, Denmark
Danish Technical Research Council, Denmark (patr.); Danish Center for Materials Technology, Denmark (patr.); Det Obelske Familiefond, Denmark (patr.)
SOURCE: (2002), 167-171, 7 refs.
Conference: International conference on new challenges in mesomechanics, Aalborg (Denmark), 26 Aug 2002
Published by: Aalborg, Aalborg
ISBN: 87-89206-59-2
DOCUMENT TYPE: Conference
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Denmark
LANGUAGE: English
AVAILABILITY: INIST-Y 34750, 354000117682650220

AN 2004-0010577 PASCAL

AB We present a micromachined cantileverbased biochemical sensor with integrated readout. Micrometer sized **cantilevers** can be used as a very sensitive tool for detecting molecular interactions by translating the molecular interaction into a nanomechanical signal. The realized **cantilevers** have integrated piezoresistive readout which, compared to **optical** readout, enables simple measurements on even non-transparent liquids, such as blood. First, we introduce a simple theory for using piezoresistive **cantilevers** as surface stress sensors. Then, the sensor fabrication based on conventional microfabrication is described. Finally, the sensor is used for submonolayer detection of cysteine and **DNA** oligos.

L37 ANSWER 4 OF 11 BIOTECHNO COPYRIGHT 2005 Elsevier Science B.V. on STN
DUPLICATE
ACCESSION NUMBER: 2001:32896215 BIOTECHNO
TITLE: **Cantilever**-based **optical** deflection assay for discrimination of **DNA** single-nucleotide mismatches
AUTHOR: Hansen K.M.; Ji H.-F.; Wu G.; Datar R.; Cote R.; Majumdar A.; Thundat T.
CORPORATE SOURCE: T. Thundat, Life Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, United States. E-mail: thundattg@ornl.gov
SOURCE: Analytical Chemistry, (01 APR 2001), 73/7 (1567-1571), 36 reference(s)
CODEN: ANCHAM ISSN: 0003-2700
DOCUMENT TYPE: Journal; Article
COUNTRY: United States
LANGUAGE: English
SUMMARY LANGUAGE: English
AN 2001:32896215 BIOTECHNO
AB Characterization of single-nucleotide polymorphisms is a major focus of current genomics research. We demonstrate the discrimination of **DNA** mismatches using an elegantly simple microcantilever-based **optical** deflection assay, without the need for external labeling. Gold-coated silicon AFM **cantilevers** were functionalized with thiolated 20- or 25-mer probe **DNA** oligonucleotides and exposed to target oligonucleotides of varying sequence in static and flow conditions. Hybridization of 10-mer complementary target oligonucleotides resulted in net positive deflection, while hybridization with targets containing one or two internal mismatches resulted in net negative deflection. Mismatched targets produced a stable and measurable signal when only a four-base pair stretch was complementary to the probe sequence. This technique is readily adaptable to a high-throughput array format and provides a distinct positive/negative signal for easy interpretation of oligonucleotide hybridization.

L37 ANSWER 5 OF 11 BIOTECHNO COPYRIGHT 2005 Elsevier Science B.V. on STN
ACCESSION NUMBER: 2001:33103747 BIOTECHNO
TITLE: Non-contact electrostatic surface force imaging of single **protein** filaments using intermolecular force microscopy
AUTHOR: Aoki T.; Sowa Y.; Yokota H.; Hiroshima M.; Tokunaga M.; Ishii Y.; Yanagida T.
CORPORATE SOURCE: T. Yanagida, Dept. of Physiology and Biosignaling, Graduate School of Medicine, Osaka University, 2-2 Yamadaoka, Suita, Osaka 565-0871, Japan. E-mail: yanagida@phys1.med.osaka-u.ac.jp
SOURCE: Single Molecules, (2001), 2/3 (183-190), 42 reference(s)
CODEN: SGMCF7 ISSN: 1438-5163
DOCUMENT TYPE: Journal; Article

COUNTRY: Germany, Federal Republic of
LANGUAGE: English
SUMMARY LANGUAGE: English
AN 2001:33103747 BIOTECHNO
AB An electrostatic force image from a single **protein** filament was measured and visualized in pure water using Intermolecular Force Microscopy (IFM). Refining atomic force microscopy in combination with very flexible **cantilevers** and an **optical** feedback system that controlled the position of the **cantilever** allowed these non-contact measurements to be made with piconewton and nanometer accuracy. **Cantilever** probes with positively charged ZnO whisker crystals as the scanning stylus were used to probe the electrostatic features of myosin filament surface. In contrast to topographical images obtained by a conventional atomic force microscope (AFM), non-contact force images revealed two areas on the myosin filament with different charge densities. A central bare zone had the greatest negative charge in the filament, which neutralized the repulsive interaction between the charged probe and a charged glass surface. The remainder of the filament was less negatively charged, because positively charged heads decreased the net charge density of the filament. This interpretation was supported by the observation that electrostatic repulsive forces exist between the S1 self-assembled monolayer formed on gold and the positively charged whiskers in a low salt solution. Thus, it is the electrostatic features of the **protein** surface, rather than the surface topography, that are measured and visualized at the molecular level.

L37 ANSWER 6 OF 11 LIFESCI COPYRIGHT 2005 CSA on STN DUPLICATE 2
ACCESSION NUMBER: 2002:52304 LIFESCI
TITLE: Surface enhancements accelerate bone bonding to CPC-coated strain gauges
AUTHOR: Cordaro, N.M.; Szivek, J.A.*; DeYoung, D.W.
CORPORATE SOURCE: Orthopaedic Research Laboratory, Department of Orthopedic Surgery and Biomedical Engineering Interdisciplinary Program, University of Arizona, Tucson, Arizona 85724, USA; E-mail: szivek@u.arizona.edu
SOURCE: Journal of Biomedical Materials Research [J. Biomed. Mater. Res.], (20010700) vol. 56, no. 1, pp. 109-119. ISSN: 0021-9304.
DOCUMENT TYPE: Journal
FILE SEGMENT: T
LANGUAGE: English
SUMMARY LANGUAGE: English
AB Calcium phosphate ceramic (CPC)-coated strain gauges have been used for in vivo bone strain measurements for up to 18 weeks, but they require 6 to 9 weeks for sufficient bonding. Osteogenic **protein**-1 (OP-1), PepTite (a proprietary **ligand**), calcium sulfate dihydrate (CSD), transforming growth factor beta -1 (TGF- beta 1), and an endothelial cell layer with and without TGF- beta 1 were used as surface enhancements to accelerate bone-to-CPC bonding. Young male Sprague-Dawley rats were implanted with unenhanced and enhanced CPC-coated gauges. Animals were allowed normal activity for 3 weeks and then calcein labeled. Femurs were explanted following euthanasia. A gauge was attached with cyanoacrylate to the opposite femur in the same position as the CPC-coated gauge. Bones were **cantilever**-loaded to assess strain transfer. They were sectioned and stained with mineralized bone stain (MIBS) and examined with transmitted and ultraviolet **light**. Mechanical testing indicated increased sensing accuracy for TGF- beta 1 and OP-1 enhancements to 105 plus or minus 14% and 92 plus or minus 12% versus 52 plus or minus 44% for the unenhanced gauges. The PepTite and the endothelial-cell-layer-enhanced gauges showed lower sensing accuracy, and histology revealed a vascular layer near CPC particles. TGF- beta 1 increased bone formation when used prior to endothelial cell sodding. CSD prevented strain transfer to the femur. TGF- beta 1 and OP-1 surface enhancements produced accurate in vivo strain sensing on the rat femur after 3 weeks.

L37 ANSWER 7 OF 11 PASCAL COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 2000-0003174 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2000 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Progress towards imaging biological samples with NSOM
Scanning and force microscopies for biomedical applications : San Jose CA, 24-25 January 1999
AUTHOR: LEE M. A.; TALLEY C. E.; VICKERY S. A.; KROGMEIER J. R.; HOLLARS C. W.; SHIKU H.; DUNN R. C.
TAMIYA Eiichi (ed.); SHUMING NIE (ed.)
CORPORATE SOURCE: Department of Chemistry, University of Kansas, Malott Hall, Lawrence, Kansas 66045, United States
International Society for Optical Engineering, Bellingham WA, United States (patr.); International Biomedical Optics Society, United States (patr.)
SOURCE: SPIE proceedings series, (1999), 3607, 60-66, 35 refs.
Conference: Scanning and force microscopies for biomedical applications. Conference, San Jose CA (United States), 24 Jan 1999
ISSN: 1017-2653
ISBN: 0-8194-3077-3
DOCUMENT TYPE: Journal; Conference
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-21760, 354000084594640080

AN 2000-0003174 PASCAL
CP Copyright .COPYRGT. 2000 INIST-CNRS. All rights reserved.
AB Advancements in near-field scanning **optical** microscopy (NSOM) tip design as well as an interferometric feedback mechanism are presented for the common goal of imaging living biological samples under physiological conditions. The ability of a cantilevered tip to track the subtle topography changes of a fragile lipid film in an aqueous environment is demonstrated. In order to further the imaging capabilities, the probes have been chemically etched to reduce the spring constants of the tips, thereby lowering the forces imparted on the sample. An **optical** feedback mechanism used as an alternative to the conventional force feedback is also described. Utilizing this **optical** feedback mechanism, images have been obtained of fixed cells underwater. Finally, progress towards modifying the NSOM tip for chemical sensor applications is discussed in the context of eventually measuring ion fluxes through single **protein** channels. Together these advancements demonstrate the potential of NSOM for studying live cells.

L37 ANSWER 8 OF 11 PASCAL COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 2000-0003286 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2000 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Scanning near-field **optical**/atomic force microscope (SNOAM) for biomedical applications
Scanning and force microscopies for biomedical applications : San Jose CA, 24-25 January 1999
AUTHOR: TAMIYA E.; IWABUCHI S.; HASHIGASAKO A.; MURAKAMI Y.; SAKAGUCHI T.; MORITA Y.; YOKOYAMA K.
TAMIYA Eiichi (ed.); SHUMING NIE (ed.)
CORPORATE SOURCE: School of Materials Science, Japan Advanced Institute of Science and Technology, 1-1 Asahidai, Tatsunokuchi, Ishikawa 923-1292, Japan
International Society for Optical Engineering, Bellingham WA, United States (patr.); International

Biomedical Optics Society, United States (patr.)
SOURCE: SPIE proceedings series, (1999), 3607, 42-51, 20 refs. Conference: Scanning and force microscopies for biomedical applications. Conference, San Jose CA (United States), 24 Jan 1999
ISSN: 1017-2653
ISBN: 0-8194-3077-3
DOCUMENT TYPE: Journal; Conference
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-21760, 354000084594640060
AN 2000-0003286 PASCAL

AB A scanning near-field **optical**/atomic-force microscope(SNOAM) system was applied to simultaneous topographic and fluorescence imaging of biological samples in air and liquid. The SNOAM uses a ben **optical** fiber simultaneously as a dynamic mode atomic-force microscopy(AFM) **cantilever** and a scanning near-field **optical** microscopy(NSOM) probe. The SNOAM system used 458 or 488 nm from Ar io laser multiline fo excitation of green fluorescent **protein**(GFP), since a native GFP has been known to give a maximum at 395 nm and a broad absorption spectrum until 500 nm. Topographic and fluorescence images of recombinant E.coli were obtained simultaneously with a high spatial resolution which was apparently better than that of a conventional confocal microscope. Nanoscopic GFP fluorescence spectrum was obtained by positioning the **optical** fiber probe above the bright area of the E.coli cells. Comparing topographic and fluorescence images, individual E.coli cells expressed different fluorescent intensity. Fluorescence obtained by SNOAM indicated GFP oxidation possibly occurred near cell surface. SNOAM also provided us with simultaneous topographical and **optical** images of human chromosomes. Native chromosomes were spread out onto a coverslip using the surface-spreading whole-mount method.Topographic images clearly indicated duplicated structure on metaphase chromosome, while fluorescence images were a different shape probably because it depended on the combination of SYBR.sup.<.sup.T.sup.M>Green I and chromosome **DNA**. Atomic force images have some artefacts, however they can be corrected by comparison with the fluorescence image. Topography and fluorescence images of RBL-2H3 mast cells surface were determined with/without DNP-BSA stimulation by SNOAM system. Near-field fluorescence images were obtained from the granules stained with quinacrine. Fluorescence profiles and intensties were largely changed after allergen stimulation. Exocytotic events of granules were specially discussed based on SNOAM.

L37 ANSWER 9 OF 11 PASCAL on STN
ACCESSION NUMBER: 1998-0432505 PASCAL

TITLE (IN ENGLISH): Improved **optical** method for measuring of AFM **cantilever** deflection
Three-dimensional and multidimensional microscopy : image acquisition and processing V : San Jose CA, 27-29 January 1998
AUTHOR: BAIBYRIN V. B.; KONNOV N. P.; VOLKOV U. P.
COGSWELL Carol J. (ed.); CONCHELLO Jose-Angel (ed.); LERNER Jeremy M. (ed.); LU Thomas (ed.); WILSON Tony (ed.)
CORPORATE SOURCE: Saratov technical university, Politechnitcheskaja 77, Saratov 410016, Russian Federation; Russian Research Anti-Plague Institute "Microbe", Universitetskaja, Saratov 410071, Russian Federation

International Society for Optical Engineering, Bellingham WA, United States (patr.); International Biomedical Optics Society, United States (patr.)
SOURCE: SPIE proceedings series, (1998), 3261, 187-192, 9 refs.
Conference: 5 Three-dimensional and multidimensional microscopy. Conference, San Jose CA (United States), 27 Jan 1998
ISSN: 1017-2653
ISBN: 0-8194-2700-4
DOCUMENT TYPE: Journal; Conference
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-21760, 354000070106310210
AN 1998-0432505 PASCAL

AB In our lab have been developed an atomic force microscope (AFM) for biological and technical applications with improved **optical** method for measuring of **cantilever** deflection. We use conventional technique of measuring the change in angle of **light** reflected off the **cantilever** with an additional lens placed between **cantilever** and four-segment photodiode. The lens forms an image of the **cantilever** in the photodiode plane. Small sizes of the **cantilever** image improve the resolution of AFM and reduce the requirements to the **optical** scheme of the microscope. The lens non-linear transmission of the **cantilever** deflection is compensated by means of computer program. With the A FM were imaged the **DNA** of plague microbes (Y.pestis EV) and phages of plague and V. Cholera.

L37 ANSWER 10 OF 11 PASCAL on STN
ACCESSION NUMBER: 1998-0156527 PASCAL

TITLE (IN ENGLISH): Single **DNA** molecule grafting and manipulation using a combined atomic force microscope and an **optical** tweezer
AUTHOR: SHIVASHANKAR G. V.; LIBCHABER A.
CORPORATE SOURCE: Center for Studies in Physics and Biology, The Rockefeller University, New York, New York 10021
SOURCE: Applied physics letters, (1997-12-22), 71(25), 3727-3729
ISSN: 0003-6951 CODEN: APPLAB
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-10020
AN 1998-0156527 PASCAL

AB In this letter, we report on spatially selecting and grafting a **DNA**-tethered bead to an atomic force microscope (AFM) **cantilever**, using an **optical** tweezer. To quantify this technique, we measure force versus extension of a single **DNA** molecule using AFM. For such studies, we have developed a micromanipulation approach by combining an AFM, an **optical** tweezer, and visualization setup. The ability to select a single **DNA** polymer and specifically graft it to a localized position on a substrate opens up new possibilities in biosensors and bioelectronic devices. .COPYRGT. 1997 American Institute of Physics.

L37 ANSWER 11 OF 11 PASCAL COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 1998-0027112 PASCAL

TITLE (IN ENGLISH): Simultaneous topographic and fluorescence imagings of recombinant bacterial cells containing a green fluorescent **protein** gene detected by a scanning near-field **optical**/atomic force microscope

AUTHOR: TAMIYA E.; IWABUCHI S.; NAGATANI N.; MURAKAMI Y.; SAKAGUCHI T.; YOKOYAMA K.; CHIBA N.; MURAMATSU H.

CORPORATE SOURCE: School of Materials Science, Japan Advanced Institute of Science and Technology, 1-1 Asahidai, Tatsunokuchi-machi, Ishikawa 923-12, Japan; Research Laboratory for Advanced Technology, Seiko Instruments Inc., Takatsuka-shinden, Matsudo-shi, Chiba 271, Japan

SOURCE: Analytical chemistry : (Washington, DC), (1997), 69(18), 3697-3701, 20 refs.
ISSN: 0003-2700 CODEN: ANCHAM

DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-120B, 354000069191470080

AN 1998-0027112 PASCAL

AB A scanning near-field **optical**/atomic force microscope (SNOAM) system was applied for simultaneous topographic and fluorescence imaging of biological samples in air and liquid. The SNOAM uses a bent **optical** fiber simultaneously as a dynamic mode atomic force microscopy **cantilever** and as a scanning near-field **optical** microscopy probe. **Optical** resolution of this system was about 50-100 nm in fluorescence mode for fluorescent latex beads on a quartz glass plate. Green fluorescent **protein** (GFP) is a convenient indicator of transformation and should allow cells to be separated by fluorescence-activated cell sorting. The gene coding to GFP was cloned in recombinant Escherichia coli. The SNOAM system used 458- or 488-nm irradiation from a multiline Ar ion laser for excitation of GFP, since a native GFP has been known to give a maximum at 395 nm and a broad absorption spectrum until 500 nm. Topographic and fluorescence images of recombinant E. coli were obtained simultaneously with a high spatial resolution which was apparently better than that of a conventional confocal microscope. A nanoscopic GFP fluorescence spectrum was obtained by positioning the **optical** fiber probe above the bright area of the E. coli cells. Comparing topographic and fluorescence images, it can be seen that individual E. coli cells expressed different fluorescence intensities. Fluorescence obtained by SNOAM indicated that GFP oxidation possibly occurred near the cell surface. A SNOAM system also indicated the possibility of precise imaging of native cells in liquid.

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                                                         ENTRY    SESSION
FULL ESTIMATED COST                                      31.87      32.08

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L38          12 FILE AGRICOLA
L39          44 FILE BIOTECHNO
L40          23 FILE CONFSCI
L41           1 FILE HEALSAFE
'AU' IS NOT A VALID FIELD CODE
L42           0 FILE IMSDRUGCONF
L43          52 FILE LIFESCI
'AU' IS NOT A VALID FIELD CODE
L44           0 FILE MEDICONF
L45         135 FILE PASCAL

TOTAL FOR ALL FILES
L46         267 MAJUMDAR A/AU

=> l46 and cantilever
L47           0 FILE AGRICOLA
L48           4 FILE BIOTECHNO
L49           1 FILE CONFSCI
L50           0 FILE HEALSAFE
L51           0 FILE IMSDRUGCONF
L52           3 FILE LIFESCI
L53           0 FILE MEDICONF
L54           9 FILE PASCAL

TOTAL FOR ALL FILES
L55          17 L46 AND CANTILEVER

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L56           14 DUP REM L55 (3 DUPLICATES REMOVED)

=> d l56 ibib abs total

L56   ANSWER 1 OF 14  BIOTECHNO  COPYRIGHT 2005 Elsevier Science B.V. on STN
ACCESSION NUMBER:         2002:36308193   BIOTECHNO
TITLE:                    Bioassays based on molecular nanomechanics
AUTHOR:                   Majumdar A.
CORPORATE SOURCE:         A. Majumdar, Nanoengineering Laboratory, Department of
                          Mechanical Engineering, University of California,
                          Berkeley, CA 94720, United States.
                          E-mail: majumdar@me.berkeley.edu
SOURCE:                   Disease Markers, (2002), 18/4 (167-174), 13
                          reference(s)
                          CODEN: DMARD3  ISSN: 0278-0240
DOCUMENT TYPE:            Journal; Conference Article
COUNTRY:                  Netherlands
LANGUAGE:                 English
SUMMARY LANGUAGE:         English
AN    2002:36308193   BIOTECHNO
AB    Recent experiments have shown that when specific biomolecular
```

interactions are confined to one surface of a microcantilever beam, changes in intermolecular nanomechanical forces provide sufficient differential torque to bend the **cantilever** beam. This has been used to detect single base pair mismatches during DNA hybridization, as well as prostate specific antigen (PSA) at concentrations and conditions that are clinically relevant for prostate cancer diagnosis. Since **cantilever** motion originates from free energy change induced by specific biomolecular binding, this technique is now offering a common platform for label-free quantitative analysis of protein-protein binding, DNA hybridization DNA-protein interactions, and in general receptor-ligand interactions. Current work is focused on developing "universal microarrays" of microcantilever beams for high-throughput multiplexed bioassays.

L56 ANSWER 2 OF 14 BIOTECHNO COPYRIGHT 2005 Elsevier Science B.V. on STN
DUPLICATE

ACCESSION NUMBER: 2001:32896215 BIOTECHNO
TITLE: **Cantilever**-based optical deflection assay for discrimination of DNA single-nucleotide mismatches
AUTHOR: Hansen K.M.; Ji H.-F.; Wu G.; Datar R.; Cote R.; **Majumdar A.**; Thundat T.
CORPORATE SOURCE: T. Thundat, Life Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, United States.
E-mail: thundattg@ornl.gov
SOURCE: Analytical Chemistry, (01 APR 2001), 73/7 (1567-1571), 36 reference(s)
CODEN: ANCHAM ISSN: 0003-2700
DOCUMENT TYPE: Journal; Article
COUNTRY: United States
LANGUAGE: English
SUMMARY LANGUAGE: English

AN 2001:32896215 BIOTECHNO
AB Characterization of single-nucleotide polymorphisms is a major focus of current genomics research. We demonstrate the discrimination of DNA mismatches using an elegantly simple microcantilever-based optical deflection assay, without the need for external labeling. Gold-coated silicon AFM **cantilevers** were functionalized with thiolated 20- or 25-mer probe DNA oligonucleotides and exposed to target oligonucleotides of varying sequence in static and flow conditions. Hybridization of 10-mer complementary target oligonucleotides resulted in net positive deflection, while hybridization with targets containing one or two internal mismatches resulted in net negative deflection. Mismatched targets produced a stable and measurable signal when only a four-base pair stretch was complementary to the probe sequence. This technique is readily adaptable to a high-throughput array format and provides a distinct positive/negative signal for easy interpretation of oligonucleotide hybridization.

L56 ANSWER 3 OF 14 BIOTECHNO COPYRIGHT 2005 Elsevier Science B.V. on STN
DUPLICATE

ACCESSION NUMBER: 2001:32165538 BIOTECHNO
TITLE: Origin of nanomechanical **cantilever** motion generated from biomolecular interactions
AUTHOR: Wu G.; Ji H.; Hansen K.; Thundat T.; Datar R.; Cote R.; Hagan M.F.; Chakraborty A.K.; **Majumdar A.**
CORPORATE SOURCE: A. Majumdar, Department of Mechanical Engineering, University of California, Berkeley, CA 94720, United States.
E-mail: majumdar@me.berkeley.edu
SOURCE: Proceedings of the National Academy of Sciences of the United States of America, (13 FEB 2001), 98/4 (1560-1564), 23 reference(s)
CODEN: PNASA6 ISSN: 0027-8424
DOCUMENT TYPE: Journal; Article

COUNTRY: United States
LANGUAGE: English
SUMMARY LANGUAGE: English
AN 2001:32165538 BIOTECHNO
AB Generation of nanomechanical **cantilever** motion from biomolecular interactions can have wide applications, ranging from high-throughput biomolecular detection to bioactuation. Although it has been suggested that such motion is caused by changes in surface stress of a **cantilever** beam, the origin of the surface-stress change has so far not been elucidated. By using DNA hybridization experiments, we show that the origin of motion lies in the interplay between changes in configurational entropy and inter-molecular energetics induced by specific biomolecular interactions. By controlling entropy change during DNA hybridization, the direction of **cantilever** motion can be manipulated. These thermodynamic principles were also used to explain the origin of motion generated from protein-ligand binding.

L56 ANSWER 4 OF 14 BIOTECHNO COPYRIGHT 2005 Elsevier Science B.V. on STN DUPLICATE
ACCESSION NUMBER: 2001:32816756 BIOTECHNO
TITLE: Bioassay of prostate-specific antigen (PSA) using microcantilevers
AUTHOR: Wu G.; Datar R.H.; Hansen K.M.; Thundat T.; Cote R.J.; **Majumdar A.**
CORPORATE SOURCE: A. Majumdar, Department of Mechanical Engineering, University of California, Berkeley, CA 94720, United States.
E-mail: majumdar@me.berkeley.edu
SOURCE: Nature Biotechnology, (2001), 19/9 (856-860), 31 reference(s)
CODEN: NABIF0 ISSN: 1087-0156
DOCUMENT TYPE: Journal; Article
COUNTRY: United States
LANGUAGE: English
SUMMARY LANGUAGE: English
AN 2001:32816756 BIOTECHNO
AB Diagnosis and monitoring of complex diseases such as cancer require quantitative detection of multiple proteins. Recent work has shown that when specific biomolecular binding occurs on one surface of a microcantilever beam, intermolecular nanomechanics bend the **cantilever**, which can be optically detected. Although this label-free technique readily lends itself to formation of microcantilever arrays, what has remained unclear is the technologically critical issue of whether it is sufficiently specific and sensitive to detect disease-related proteins at clinically relevant conditions and concentrations. As an example, we report here that microcantilevers of different geometries have been used to detect two forms of prostate-specific antigen (PSA) over a wide range of concentrations from 0.2 ng/ml to 60 μg/ml in a background of human serum albumin (HSA) and human plasminogen (HP) at 1 mg/ml, making this a clinically relevant diagnostic technique for prostate cancer. Because **cantilever** motion originates from the free-energy change induced by specific biomolecular binding, this technique may offer a common platform for high-throughput label-free analysis of protein-protein binding, DNA hybridization, and DNA-protein interactions, as well as drug discovery.

L56 ANSWER 5 OF 14 PASCAL COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on STN
ACCESSION NUMBER: 2000-0527989 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2000 American Institute of Physics. All rights reserved.
TITLE (IN ENGLISH): Chemical sensing in Fourier space
AUTHOR: THUNDAT T.; FINOT E.; HU Z.; RITCHIE R. H.; WU G.; **MAJUMDAR A.**

CORPORATE SOURCE: Life Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831-6123; Department of Mechanical Engineering, University of California, Berkeley, California 94720
SOURCE: Applied physics letters, (2000-12-11), 77(24), 4061-4063
ISSN: 0003-6951 CODEN: APPLAB
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-10020
AN 2000-0527989 PASCAL

AB Chemical sensing using optical diffraction from an array of microcantilevers is demonstrated. Properly fashioned arrays of micromachined silicon-nitride **cantilevers** containing embedded deformable diffraction gratings are functionalized with chemically selective coatings. Adsorption of specific molecules on the **cantilever** leads to bending, which changes the diffraction pattern of a laser beam reflecting off the array. Quantitative chemical information can be obtained by monitoring the displacement of diffraction peaks as a function of analyte exposure. .COPYRGT. 2000 American Institute of Physics.

L56 ANSWER 6 OF 14 PASCAL on STN
ACCESSION NUMBER: 2001-0016848 PASCAL

TITLE (IN ENGLISH): Infrared vision using uncooled optomechanical camera Photoreceptors : materials and devices V : San Jose CA, 26-28 January 2000
AUTHOR: **MAJUMDAR A.**; MAO M.; PERAZZO T.; ZHAO Y.; KWON O.; VARESI J.; NORTON P.
BROWN Gail J. (ed.); RAZEGHI Manijeh (ed.)
CORPORATE SOURCE: Department of Mechanical Engineering, University of California, Berkeley, CA 94720, United States; Santa Barbara Research Center, Raytheon, 75 Coromar Drive, Goleta, CA 93117, United States
SOURCE: SPIE proceedings series, (2000), 3948, 74-79, 11 refs.
Conference: 5 Photodetectors : materials and devices. Conference, San Jose CA (United States), 26 Jan 2000
ISSN: 1017-2653
ISBN: 0-8194-3565-1
DOCUMENT TYPE: Journal; Conference
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-21760, 354000092005110070
AN 2001-0016848 PASCAL

AB An uncooled infrared (IR) imaging system that is based on thermomechanical sensing of IR radiation in conjunction with a visible optical readout has been developed. The system contains a focal plane array (FPA) consisting of bimaterial **cantilever** beams made of silicon nitride (SiN.sub.x) and gold (Au) in each pixel. Absorption of incident IR radiation in the 8-14 μm wavelength range by SiN.sub.x in each **cantilever** beam raises its temperature, resulting in proportional deflection due to mismatch in thermal expansion of the two **cantilever** materials. The FPA design involved maximizing the thermal resistance between the pixel and its surroundings, maximing the thermomechanical response within the constraints of the pixel size,

optimizing the pixel time response, and maximizing the IR absorption using thin film optics. Microfabrication of stress-balanced bimaterial **cantilevers** was achieved by varying the silicon concentration along the thickness of the SiN.sub.xfilms in order to balance the residual tensile stress in the Au film and the Cr adhesion layer between Au and SiN.sub.x. The optical readout utilized Fourier diffractive optics to simultaneously detect deflections of all **cantilevers** using a single light source. The results suggest that objects at temperatures as low as 30 °C can be imaged with the best noise-equivalent temperature difference (NETD) in the range of 2-5 K. It is estimated that further improvements that are currently being pursued can improve NETD below 5 mK.

L56 ANSWER 7 OF 14 PASCAL COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 1999-0260558 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 1999 American Institute of Physics. All rights reserved.
TITLE (IN ENGLISH): Infrared vision using uncooled micro-optomechanical camera
AUTHOR: PERAZZO T.; MAO M.; KWON O.; **MAJUMDAR A.**; VARESI J. B.; NORTON P.
CORPORATE SOURCE: Department of Mechanical Engineering, University of California, Berkeley, California 94720; Santa Barbara Research Center, 75 Coromar Drive, Goleta, California 93117
SOURCE: Applied physics letters, (1999-06-07), 74(23), 3567-3569
ISSN: 0003-6951 CODEN: APPLAB
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-10020

AN 1999-0260558 PASCAL
CP Copyright .COPYRGT. 1999 American Institute of Physics. All rights reserved.
AB This letter presents the design, fabrication, and imaging results of an uncooled infrared (IR) camera that contains a focal plane array of bimaterial microcantilever sensors, and an optical readout technique that measures **cantilever** deflections in the nanometer range to directly project a visible image of the IR scene on the human eye or a visible camera. The results suggest that objects at temperatures as low as 100<hair thin space>°C can be imaged with the best noise-equivalent temperature difference (NEΔT) in the range of 10 K. It is estimated that further improvements that are currently being pursued can improve NEΔT to about 50 mK. .COPYRGT. 1999 American Institute of Physics.

L56 ANSWER 8 OF 14 PASCAL COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 2000-0105631 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 2000 INIST-CNRS. All rights reserved.
TITLE (IN ENGLISH): Thermal expansion and temperature measurement in a microscopic scale by using the atomic force microscope
AUTHOR: IGETA M.; INOUE T.; VARESI J.; **MAJUMDAR A.**
CORPORATE SOURCE: Mechano-Aerospace Engineering, Tokyo Institute of Technology, 2-12-1 Ohokayama, Meguroku, Tokyo 152-8552, Japan; Department of Mechanical Engineering, University of California, Santa Barbara, California 93106, United States; Department of Mechanical Engineering, University of California, Berkeley, California 94720, United States

SOURCE: JSME international journal. Series B, fluids and thermal engineering, (1999), 42(4), 723-730, 16 refs. ISSN: 1340-8054
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Japan
LANGUAGE: English
AVAILABILITY: INIST-9189B, 354000081267250190
AN 2000-0105631 PASCAL

AB An experimental study on microscopic scale measurements of thermal expansion and temperature by using the Scanning Joule Expansion Microscope (SJEM) based on the Atomic Force Microscope (AFM) was conducted. While the AFM is scanning on the sample heated by AC current, topographical and thermal expansion images are measured simultaneously by detecting DC and AC motions of the **cantilever**. In order to apply this technique to the temperature measurement in microscopic scale, the sample was covered with a thin film of polymer (PMMA) which has a high thermal expansion coefficient compared with metals and dielectric materials. Merits of this technique are (1 quite simplicity of measurement because of using the commercial **cantilever** instead of complicated thermal **cantilever** for the typical Scanning Thermal Microscopy (SThM) and (2) a higher spatial resolution of 20 nm which is restricted by the point contact scale between the **cantilever** and the sample.

L56 ANSWER 9 OF 14 PASCAL on STN
ACCESSION NUMBER: 2000-0038164 PASCAL

TITLE (IN ENGLISH): Application of Fourier optics for detecting deflections of infrared-sensing microcantilever arrays
AUTHOR: ZHAO Y.; MAO M.; **MAJUMDAR A.**
CORPORATE SOURCE: Department of Mechanical Engineering, University of California, Berkeley, California, United States
SOURCE: Microscale thermophysical engineering : (Print), (1999), 3(4), 245-251, 4 refs. ISSN: 1089-3954
DOCUMENT TYPE: Journal; General Review
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United Kingdom
LANGUAGE: English
AVAILABILITY: INIST-26457, 354000080271390020
AN 2000-0038164 PASCAL

AB This article presents the theory and experimental results of an optical imaging technique that simultaneously measures the deflections of a focal plane array of bimaterial microcantilevers that are used as thermomechanical infrared sensors. Based on Fourier optics, this technique is used for infrared vision of room-temperature objects with a noise-equivalent temperature difference (NETD) in the range of 2-5 K. Efforts are currently underway to improve the NETD to the range of 30-50 mK.

L56 ANSWER 10 OF 14 PASCAL on STN
ACCESSION NUMBER: 1998-0274973 PASCAL

TITLE (IN ENGLISH): Thermal microscopy and heat generation in electronic devices
AUTHOR: **MAJUMDAR A.**
CORPORATE SOURCE: Department of Mechanical Engineering, University of

California, Berkeley, CA 94720, United States
SOURCE: Microelectronics and reliability, (1998), 38(4), 559-565, 26 refs.
Conference: 8 European Symposium Reliability of Electron Devices, Failure Physics and Analysis (ESREF'97), Bordeaux (France), 7 Oct 1997
ISSN: 0026-2714 CODEN: MCRLAS
DOCUMENT TYPE: Journal; Conference
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United Kingdom
LANGUAGE: English
AVAILABILITY: INIST-9626, 354000076120630100
AN 1998-0274973 PASCAL

AB This paper reports our progress on the development of thermal microscopy for studying heat generation in electronic devices and interconnects. The resolution of the scanning thermal microscope has been improved from about 500 nm achieved by the first wire thermocouple probes to about 25 nm for the more recent thin-film thermocouple probes. These have been used to measure the temperature distribution and hot spots of single transistors, short circuits in transistors created by electrostatic discharge failures, as well as novel devices such as vertical-cavity surface emitting lasers and magnetoresistive reading heads. Recently, a new technique called scanning Joule expansion microscopy has been developed to measure the temperature distribution of electrically heated samples with about 10 nm spatial resolution. The advantage of this technique is that it does not require fabrication of temperature-sensing probes and can use commercially-available **cantilever** probes that are employed in atomic force microscopes.

L56 ANSWER 11 OF 14 PASCAL COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on STN
ACCESSION NUMBER: 1997-0377515 PASCAL

TITLE (IN ENGLISH): Optimization and performance of high-resolution micro-optomechanical thermal sensors
AUTHOR: LAI J.; PERAZZO T.; SHI Z.; **MAJUMDAR A.**
CORPORATE SOURCE: Department of Mechanical and Environmental Engineering, University of California, Santa Barbara, CA 93106, United States
SOURCE: Sensors and actuators. A, Physical, (1997), 58(2), 113-119
ISSN: 0924-4247
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: Switzerland
LANGUAGE: English
SUMMARY LANGUAGE: English
AVAILABILITY: INIST-19425A, 354000067690700010
AN 1997-0377515 PASCAL

AB Copyright (c) 1997 Elsevier Science S.A. All rights reserved.The ability to detect optically the deflections of microfabricated bi-material **cantilever** beams with 3 pm resolution has allowed the measurement of temperature, optical power, and energy with 2 μK, 76 pW, and 15 fJ resolution, respectively. The thickness ratio of the two beam materials is optimized to produce 40% improvement over previous designs. The governing equations for the sensor performance have been developed and form the basis for designing better **cantilever** shape for further performance improvements. Efforts are underway to detect **cantilever** deflections with 100 fm resolution, so that the thermal performance can be improved by an order of magnitude. Such unprecedentedly high resolutions are opening up promising prospects for

their use in infrared detection and in studying molecular-level adsorption and surface chemical reactions.

L56 ANSWER 12 OF 14 PASCAL COPYRIGHT 2005 INIST-CNRS. ALL RIGHTS RESERVED. on STN

ACCESSION NUMBER: 1995-0292322 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 1995 American Institute of Physics. All rights reserved.
TITLE (IN ENGLISH): Thermal imaging by atomic force microscopy using thermocouple **cantilever** probes
AUTHOR: **MAJUMDAR A.**; LAI J.; CHANDRACHOOD M.; NAKABEPPU O.; WU Y.; SHI Z.
CORPORATE SOURCE: Department of Mechanical and Environmental Engineering, University of California, Santa Barbara, California 93106
SOURCE: Review of Scientific Instruments, (1995-06), 66(6), 3584-3592
ISSN: 0034-6748 CODEN: RSINAK
DOCUMENT TYPE: Journal
BIBLIOGRAPHIC LEVEL: Analytic
COUNTRY: United States
LANGUAGE: English
AVAILABILITY: INIST-151

AN 1995-0292322 PASCAL
CP Copyright .COPYRGT. 1995 American Institute of Physics. All rights reserved.
AB Thermocouple **cantilever** probes are used in the atomic force microscope (AFM) to simultaneously obtain thermal and topographical images of surfaces with submicrometer scale spatial resolution. Three designs of thermocouple AFM probes and the thermal images obtained by each of them are presented here. Experiments show that the dominant mechanism for sample-probe heat transfer is gas conduction. If probes are not properly designed, this could lead to image distortion and loss of temperature and spatial resolution. The steady state probe behavior is dominated by the gas thermal conductivity whereas the transient effects are dominated by the thermal mass of the probe. Thermal images of single transistors show their thermal characteristics under different biasing conditions. In addition, hot spots created by short-circuit defects within a transistor can be located by this technique. Efforts are underway to improve the spatial resolution from 0.4 to 0.05 μm by careful probe design. The results suggest that this can be achieved when the size of the thermal sensor at the tip of an AFM **cantilever** probe is of the order of the tip radius. .COPYRGT. 1995 American Institute of Physics.

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ACCESSION NUMBER: 1995-0123725 PASCAL
COPYRIGHT NOTICE: Copyright .COPYRGT. 1995 American Institute of Physics. All rights reserved.
TITLE (IN ENGLISH): Scanning thermal imaging microscopy using composite **cantilever** probes
AUTHOR: NAKABEPPU O.; CHANDRACHOOD M.; WU Y.; LAI J.; **MAJUMDAR A.**
CORPORATE SOURCE: Department of Mechanical and Environmental Engineering, University of California, Santa Barbara, California 93106
SOURCE: Applied Physics Letters, (1995-02-06), 66(6), 694-696
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AB We have developed a simple technique of measuring surface temperature contrast with submicron spatial resolution. The technique uses the atomic force microscope (AFM) to scan a composite **cantilever** probe made of a thin metal film (aluminum or gold) deposited on a regular silicon nitride AFM probe. During tip-surface contact, heat flow through the tip changes the **cantilever** temperature which bends the **cantilever** due to differential thermal expansion of the two probe materials. An ac measurement is used to separate **cantilever** bending due to temperature and topography. To eliminate image distortion due to air heat conduction, thermal images of a biased resistor were obtained in vacuum (10.sup.-.sup.5 Torr). The images showed hot spots due to current crowding around voids in the heater and suggested a spatial resolution of 0.4 μm. .COPYRGT. 1995 American Institute of Physics.

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CORPORATE SOURCE: Univ. California, CA, USA
SOURCE: IHTC-11, Department of Mechanical Engineering, Seoul National University, Seoul, Korea; phone: +82 2 880 7117; fax: +82 2 883 0179; email: jsleeong.snu.ac.kr, Contact IHTC for availablilty. Poster Paper.
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